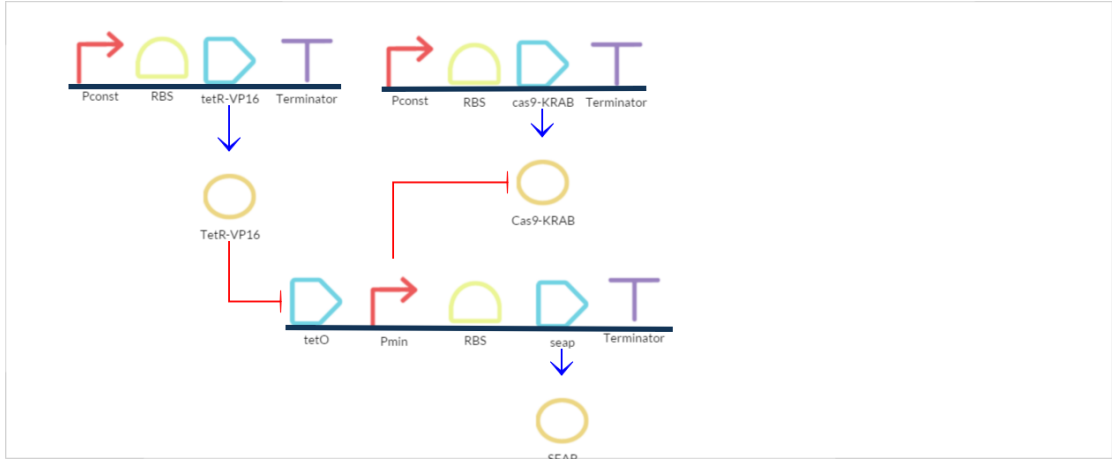


Cas-KRAB



Formulae for two certain parts

TetR-VP16 and tetR-VP16

$$\frac{d[\text{TetR} - \text{VP16}]}{dt} = \chi_{Pconst_1} k_3 [\text{tetR} - \text{VP16}] - D_{\text{TetR-VP16}} [\text{TetR} - \text{VP16}]$$

$$D_{\text{TetR-VP16}} = k_4$$

Cas9-KRAB and cas9-KRAB

$$\frac{d[\text{Cas 9} - \text{KRAB}]}{dt} = \chi_{Pconst_2} k_1 [\text{cas 9} - \text{KRAB}] - D_{\text{Cas9-KRAB}} [\text{Cas 9} - \text{KRAB}]$$

Cas9-KRAB and Pmin

$$\frac{d[\text{Cas 9} - \text{KRAB}]}{dt} = -\chi_{Pmin_1} \frac{k_6 m_{\text{TetR}} [\text{Cas 9} - \text{KRAB}]}{(1 + k_7 [\text{Cas 9} - \text{KRAB}])} - D_{\text{Cas9-KRAB}} [\text{Cas 9} - \text{KRAB}]$$

TetO1 and TetR-VP16

$$m_{\text{TetR}} = \frac{k_8}{k_8 + \chi_{\text{tetO}_1} [\text{TetR} - \text{VP16}]}$$

SEAP and seap

$$\frac{d[\text{SEAP}]}{dt} = \chi_{Pmin_2} k_7 [\text{seap}] - D_{\text{deg}} [\text{SEAP}]$$

Formulae for numerical simulation

$$\frac{d[\text{TetR} - \text{VP16}]}{dt} = \chi_{P_{const_1}} k_3 [\text{tetR} - \text{VP16}] - D_{\text{TetR-VP16}} [\text{TetR} - \text{VP16}]$$

$$D_{\text{TetR-VP16}} = k_4$$

$$\frac{d[\text{Cas9} - \text{KRAB}_1]}{dt} = \chi_{P_{const_2}} k_1 [\text{cas9} - \text{KRAB}] - \chi_{P_{min_1}} \frac{k_6 m_{\text{TetR}} [\text{Cas9} - \text{KRAB}]}{(1 + k_7 [\text{Cas9} - \text{KRAB}])} - D_{\text{Cas9-KRAB}} [\text{Cas9} - \text{KRAB}]$$

$$m_{\text{TetR}} = \frac{k_8}{k_8 + \chi_{\text{tetO}} [\text{TetR} - \text{VP16}]}$$

$$\frac{d[\text{SEAP}]}{dt} = \chi_{P_{min_2}} k_7 [\text{seap}] - D_{\text{deg}} [\text{SEAP}]$$

Parameter Table

Symbols	Parameters	Values and Units
K_1	Linear production rate of Cas9	8.78E+02[M/h]
K_2	Cas9 degradation rate	0.54[1/h]
K_3	tracr/crRNA production rate	0.73
K_4	tracr/crRNA degradation rate	1.21E+0.8
K_5	Gene recognition complex building rate	1.61[1/M]
K_6	Cr/trRNA/Cas9 degradation rate	8.59E-26
K_7	SEAPs leaky production rate	4.05E-05[M/h]
K_8	Complex dependent SEAP production rate	1.86E+08[M/h]
K_9	Cas9-VP16 specific constant	1.06

Reference: <http://2013.igem.org/Team:Freiburg>